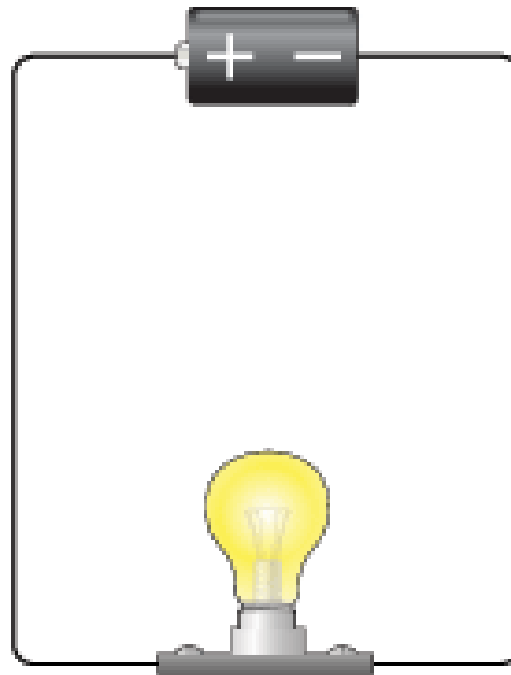


2.4 Cells & Batteries

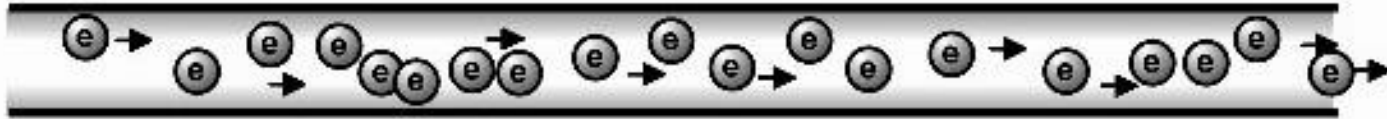
What is an electric circuit?

- ▶ A closed path along which electrons that are powered by an energy source can flow.
- ▶ [animation](#)

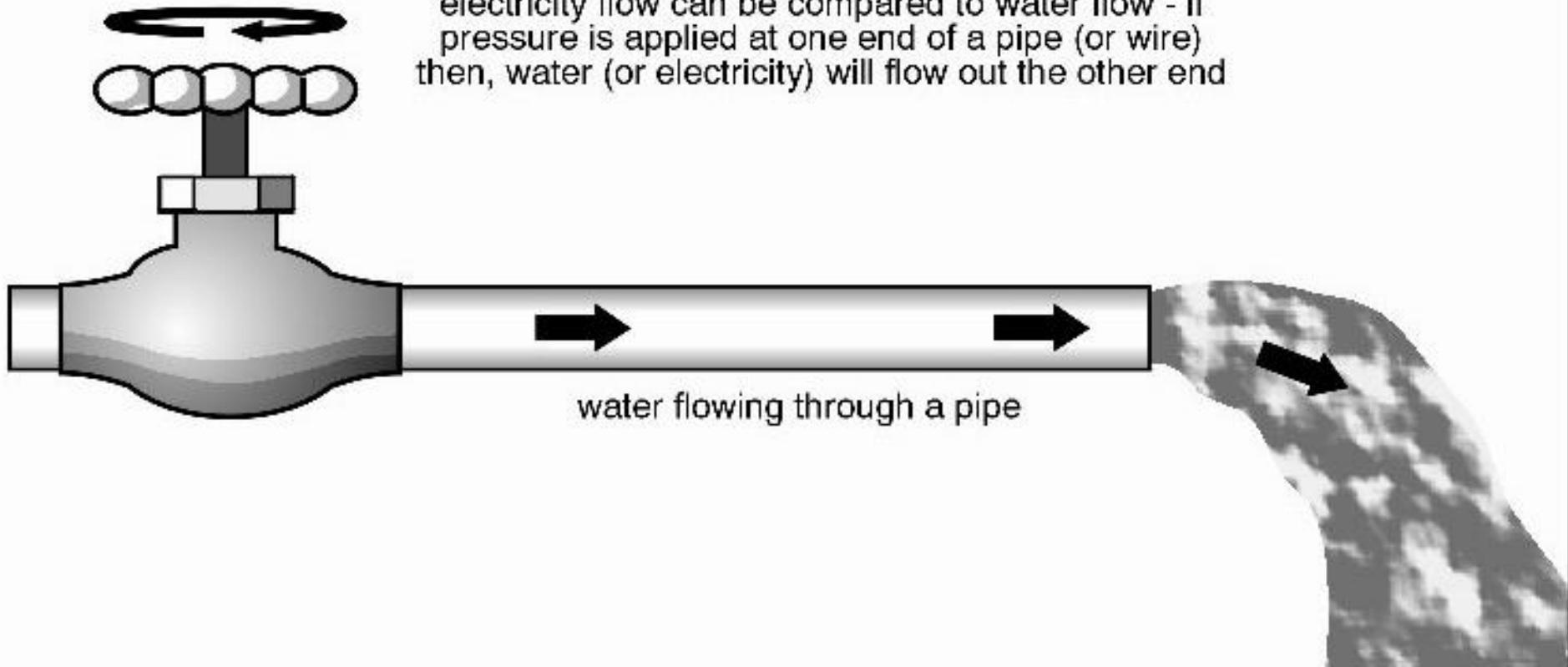


Electric current is like water flowing through a pipe:

electrons (electricity) travelling along a wire



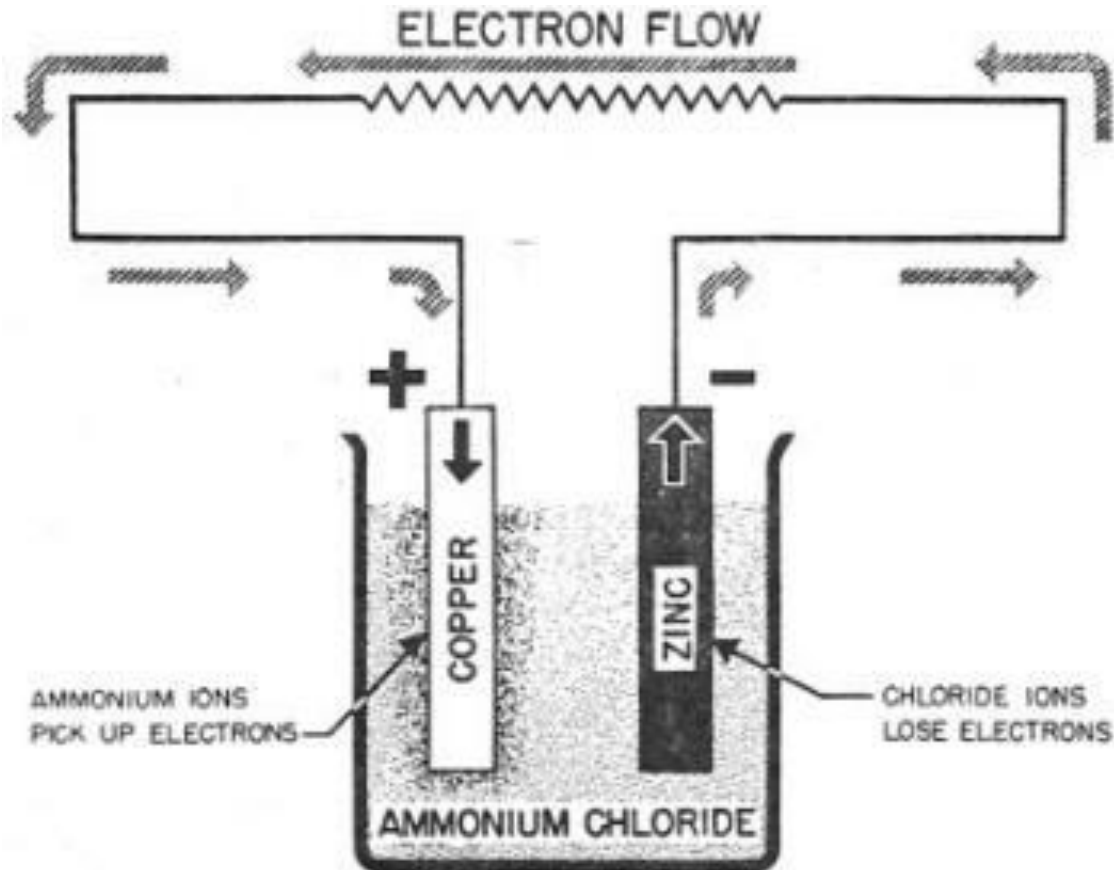
electricity flow can be compared to water flow - if pressure is applied at one end of a pipe (or wire) then, water (or electricity) will flow out the other end



water flowing through a pipe

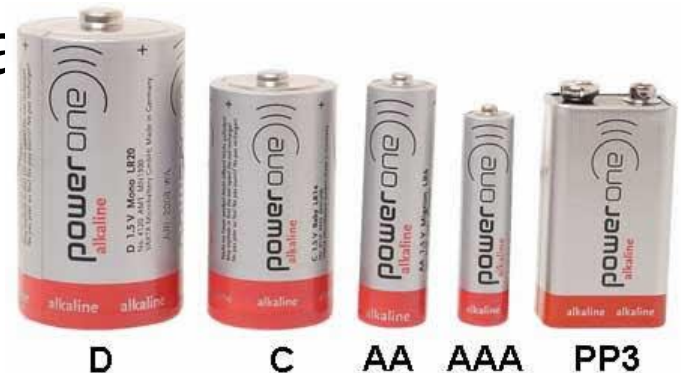
Voltaic Cells Penny battery

- ▶ Generates an electric current by chemical reactions involving 2 different metals or metal compounds separated by a solution that is a conductor.



Terminology

- ▶ **Cells**: single voltaic cell (i.e. AA, D, etc., technically it is incorrect to call these batteries)
- ▶ **Battery**: a connection of one or more cells
- ▶ **Electrode**: Metal terminals in cell or battery
- ▶ **Electrolyte**: a solution or paste that conducts charge



Types of Cells?

- ▶ **Dry Cell** = cell that contains an electrolyte (paste)
- ▶ **Wet Cell** = cell that contains a liquid electrolyte (i.e. sulfuric acid)
- ▶ **Primary cell** = cell that can be used only once (i.e. calculators, hearing aids, toothbrushes, etc.)
- ▶ **Secondary cell** = cell that can be recharged (i.e. lead-acid battery for in cars, trucks, etc.)



Battery types

Batteries

Chemical batteries

(Chemical energy
↓
Electric energy)

Primary batteries (Non-rechargeable)

Zinc-carbon batteries
Alkaline manganese batteries
★ Lithium metal batteries
Others



Secondary batteries (Rechargeable)

Lead-acid batteries
★ Ni-Cd Alkaline batteries
Ni-MH batteries
Lithium ion batteries
Others



Fuel cells

(Power generation by supplying Chemical energy from outside)

Physical batteries

(Physical energy
↓
Electric energy)

Solar cells (Power generation from solar light)

Nuclear power batteries

(power generation from radiation) and others

More Types of Cells

- ▶ **Fuel Cells** = cell that generates electricity through the chemical reactions of fuel that is stored outside the cell (i.e. hydrogen fuel cell)



Toyota Mirai

- ▶ **Solar Cells** = cell that converts sunlight into electrical energy

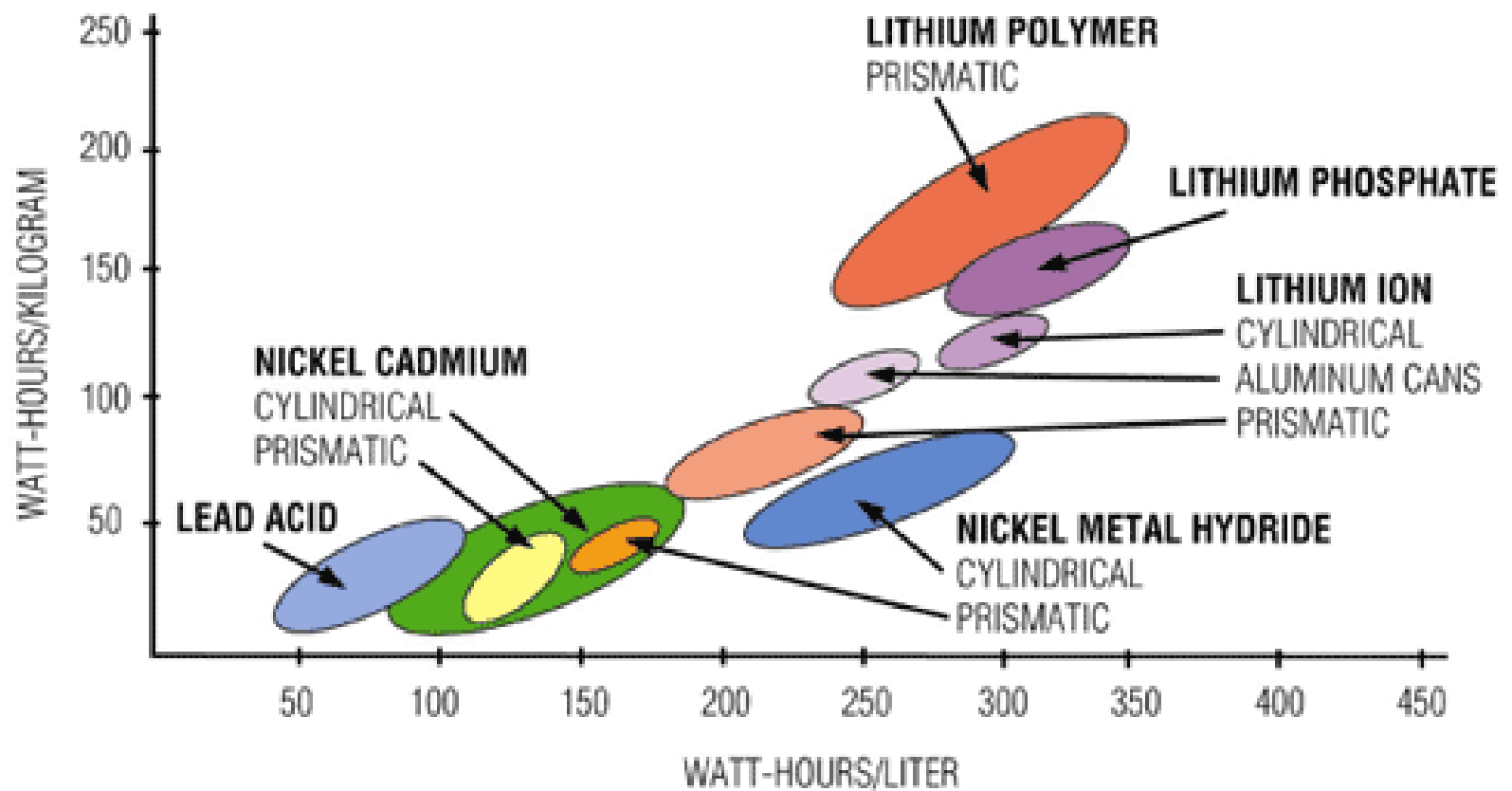


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ASSIGNED WORK

- ▶ READ P. 432 – 436
- ▶ Q p.436 #1 to 5